

REMARKS

In the amendments presented herein, claims 9 and 10 have been amended to correct typography, and claims 13-16 are new. Support for the new claims can be found throughout the specification and claims of the application as filed. Now pending in the application are claims 9 – 16. No new matter has been added.

Interview Summary

Applicants' undersigned representative thanks the Examiner for the courtesy of a telephonic interview conducted on March 15, 2006. During the interview, the outstanding rejections of claims 9-12 under 35 U.S.C. §102 and §103 were discussed. No final agreement was reached.

Claims Rejections – 35 U.S.C. §102

Claims 9, 11, and 12 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Yamada et al. (US 6,040,092). The Office Action asserts that Yamada discloses secondary lithium batteries, wherein the coated graphite material satisfies the requirements of pending claims 9, 11 and 12. This rejection is traversed.

Claim 9 (and claims 10-12 which depend therefrom) is directed to a lithium ion secondary battery including, *inter alia*, a negative electrode comprising a carbon material capable of charging and discharging lithium ions. The carbon material includes an amorphous carbon-coated graphitic carbonaceous material prepared by coating the particle surfaces of a graphite material with a carbonizable organic material, calcining and pulverizing the coated graphite material. According to the claims, the graphite material which forms the core of the coating material satisfies the following conditions (a) and (b):

(a) when the BET specific surface area of the graphite material is represented by y (m^2/g) and the particle size by x (μm), the graphite material satisfies the following formula (I):

$$y \leq Cx^{-0.6} \quad (C=52 \text{ m}^2/(\text{g} \cdot \mu\text{m}^{-0.6}), 4 \leq x \leq 40, 4.9 \leq y \leq 25) \quad (\text{I});$$

(b) in Raman spectroscopic analysis using argon ion laser light with a wavelength of 5,145 Å, the ratio of the strength of the peak existing in the region of 1,350-1,370 cm^{-1} (IB) to the strength of the peak existing in the region of 1,570-1,620 cm^{-1} (IA), which is represented by an R value (IB/IA), is 0.001 to 0.2.

In the Office Action, the Examiner has alleged that Yamada et al., U.S. Patent No. 6,040,092, discloses (at Yamada Col. 10, line 63 to Col. 11, line 1) a coated graphite material satisfying the limitations of claim 9 (see Office Action, bottom of page 3). Applicants respectfully point out that the material to which the Examiner refers is stated by Yamada (at Col. 11, line 1), to have a specific surface area of 3.8 m^2/g . Thus, even if this material otherwise met the limitations of claim 9 (which Applicants do not concede), the stated surface area of this material of Yamada does not satisfy the requirement that the BET specific surface area (y , expressed as m^2/g) be in the range $4.9 \leq y \leq 25$, as required by pending claim 9. Moreover, this material cited by the Examiner is a coated graphite (as the Examiner has recognized), not a graphite material which forms the core of the coating material, as required by claim 9 (and claims dependent therefrom). Thus, this portion of the Yamada patent does not and cannot anticipate the pending claims.

The Examiner also pointed to Yamada as disclosing a "core graphite" with "a particle size of 14 μm , a surface area of 10.3 m^2/g , and a R value of 0.2," referring to Col. 10, lines 39-45 of Yamada. Office Action at page 3. Applicants respectfully disagree with the Examiner's interpretation of the disclosure of Yamada.

The Yamada patent, at Col. 10, lines 39-45 thereof, discusses an electrode allegedly made using "artificial graphite KS25 produced by Lonza Ltd. (flaky, particle size 14 μm , . . . $R=0.2$, specific surface area =10.3 m^2/g)." (Applicants note that the same description of artificial graphite powder KS25 appears at Col. 12, lines 6-9). However, Yamada also refers to artificial graphite powder KS25 in Embodiment 10 at Col. 9, lines 61-63 as follows: "spherical, particle size 18 μm , . . . $R=0.36$, specific surface area =7.6 m^2/g " (emphasis supplied).

Applicants respectfully contend that the KS25 material cannot simultaneously be "flaky" and "spherical," have a particle size of 14 μm and 18 μm , have an R value of 0.2 and 0.36, and have a specific surface area of 10.3 m^2/g and 7.6 m^2/g .

Adding to the confusion, Yamada also refers to artificial graphite powder KS25 in Embodiment 11 (Col. 10, lines 57-59) as having the following properties: "flaky, particle size 14 μm , . . . $R=0.2$, specific surface area = 1.5 m^2/g " (emphasis supplied).

In view of the different physical shapes and properties of KS25 as described by Yamada, Applicants respectfully contend that either the description in Yamada of artificial graphite KS25 is in error in one or more places, or that the material referred to in Yamada, e.g., at Col. 10, lines 40-43 (discussed by the Examiner), is not KS25, but rather a different material altogether.

In view of the lack of clarity and consistency, as noted above, the Yamada patent cannot be considered to disclose a material satisfying the requirements of pending claims 9-12, and therefore cannot anticipate those claims.

Furthermore, with respect to claims 11 and 12, none of the materials to which the Examiner has pointed in Yamada has an R value of at most 0.15, as required by claim 11, or at most 0.11, as required by claim 12. While the Examiner points to a general statement in Yamada concerning R values, the specific materials to which the Examiner points as allegedly meeting other limitations of the pending claims do not meet the stated requirement of claims 11 and 12 with respect to the R value and, Applicants contend, cannot anticipate claims 11-12.

Moreover, the material of Col. 10, lines 40-43 of Yamada was apparently not coated with an amorphous carbon-coated graphitic carbonaceous material prepared by coating the particle surfaces of a graphite material with a carbonizable organic material, calcining and pulverizing the coated graphite material, as required by pending claims 9-12. For this reason, too, the disclosure of Yamada does not and cannot anticipate the invention of the pending claims.

Reconsideration and withdrawal of the rejection is proper and such action is requested.

Claims Rejections – 35 U.S.C. §103

Claim 10 was rejected under 35 U.S.C. §103(a) as being anticipated by, or in the alternative, obvious over Yamada et al. (US 6,040,092). This rejection is traversed.

The anticipation rejection has been addressed above. In addition, Applicants cannot agree with the Examiner's view that the properties of the Yamada material inherently include a half-value width of the peak existing at 1,570-1620 cm^{-1} , which is represented by a $\Delta\nu$ value, is 14 to 22, as measured by Raman spectroscopic analysis (as required by pending claim 10). There is simply no basis for the Examiner to assert that the Yamada materials inherently meet the

limitations of the claims. As the Examiner has correctly noted, inherent anticipation can only lie where a missing feature is *necessarily present* in that which is described in the reference. It clearly cannot be the case that the claimed Raman spectroscopic qualities of the materials of the claimed invention are necessarily present in the materials of the Yamada reference.

As to the obviousness rejection, Applicants respectfully disagree with the Examiner's position. As discussed above, in view of the lack of clarity and consistency, Applicants submit that the Yamada patent cannot be said to disclose Applicants' claimed invention, and there is no teaching or suggestion in Yamada to modify the materials disclosed therein so as to arrive at the presently-claimed invention. Thus, Yamada does not and cannot render obvious the pending claims.

Moreover, the Examiner's citation of *In re Boesch* is inapt. The holding in *Boesch* cited by the Examiner is that "discovery of an optimum value of a result effective variable *in a known process* is ordinarily within the skill of the art." *Boesch*, 205 USPQ 215 at 219 (emphasis added). As discussed in the MPEP, "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." MPEP 2144.05, citing *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

In the present case, the Examiner has apparently taken the position that the value of R is a "result-effective variable," but has not pointed to any teaching or suggestion in the Yamada patent to support that conclusion. Applicants respectfully contend that the cited reference does not render obvious the claimed invention.

New claims 13 – 16

New claims 13-16 are directed to a process for producing an amorphous carbon-coated graphitic carbonaceous material for use as a negative electrode in a lithium ion secondary battery. The claimed process includes coating the particle surfaces of a graphite material with a carbonizable organic material, calcining the coated graphitic material and pulverizing the calcined material. The graphite material satisfies the following conditions (a) and (b):

(a) when the BET specific surface area of the graphite material is represented by y (m^2/g) and the particle size by x (μm), the graphite material satisfies the following formula (I):

$$y \leq Cx^{-0.6} \text{ (C=52 m}^2\text{/(g}\cdot\mu\text{m}^{-0.6}\text{), } 4 \leq x \leq 40, 4.9 \leq y \leq 25) \quad (\text{I});$$

(b) in Raman spectroscopic analysis using argon ion laser light with a wavelength of 5,145 Å, the ratio of the strength of the peak existing in the region of 1,350-1,370 cm⁻¹ (IB) to the strength of the peak existing in the region of 1,570-1,620 cm⁻¹ (IA), which is represented by an R value (IB/IA), is 0.001 to 0.2.

The discussion above with respect to claims 9-12 also applies *mutatis mutandis* to the new claims. Applicant submit that the Yamada reference does not teach or suggest a process in which particle surfaces of a graphite material as claimed are coated with a carbonizable organic material, followed by calcining the coated graphitic material and pulverizing the calcined material.

Applicants therefore respectfully contend that new claims 13-16 are in condition for allowance.


Conclusion

For at least the foregoing reasons, Applicants request reconsideration of the application. Early and favorable action is requested.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 48699CPA2(71360). A duplicate copy of this paper is enclosed.

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Respectfully submitted,

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